# CIVIL QUALITY CONSULTANTS & ENGINEERS

(Buildings Geo-Tech & Highway Materials Testing Laboratory)
An ISO 9001: 2015 Certified Company
*NABL Accredited As Per ISO/IEC : 17025:2005 Laboratory*

JAS-ANZ
ISO 9001:2000 CERTIFIED


Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 29.12.2018

## TEST REPORT

| | | |
|---|---|---|
| **CLIENT** | : | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **AGENCY** | : | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **NAME OF THE WORK** | : | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| **NAME OF ROAD** | : | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **SAMPLE ID** | : | Cement |
| **SAMPLES SUPPLIED BY** | : | AGENCY |

The results of the tests conducted on the cement sample are as follows:

| Sl.No | Descriptions | Test Method as per IS | Test Result | Requirements as per IS: 12269-1987 |
|---|---|---|---|---|
| 1 | a) Initial Setting Time | IS-4031 (Part -5) | 145 Minutes | Not Less than 30 Minutes |
| | b) Final Setting Time | IS-4031 (Part -5) | 375 Minutes | Not More than 600 Minutes |
| 2 | Soundness | IS-4031 (Part 3) by the Le-Chatelier method | 1 mm | Not more than 10 mm |
| 3 | Standard Consistency | IS-4031 (Part -4) | 28.00 % | - |

Note:

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For CIVIL QUALITY CONSULTANTS & ENGINEERS


Office & Laboratory : # 133, Bhuvaneshwarinagar, Dodda Basti Main Road, Bangalore - 560 056.
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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 29.12.2018

## TEST REPORT ON FINE AGGREGATES (SAND)
## IS 383-1970 (RA- 2002)

**Client** : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
**Agency** : **Sri. M S Venkatesh,** Contractor, Bangalore.
**Name of Work** : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore.
**Name of Road** : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14.
Date of Testing : 29.12.2018
Material : Sand
Total Wt. of Aggregates in gms **1000**

| Is Sieve Size in mm | Weight Retained (gm) | Retained Weight in % | Cumulative Retained Weight in % | Cumulative Weight Passing in % | Spec.Limits For Zone-II |
|---|---|---|---|---|---|
| 10 | 0 | 0 | 0 | 100 | 100 |
| 4.75 | 86 | 8.60 | 8.60 | 91.4 | 90-100 |
| 2.36 | 135 | 13.50 | 22.10 | 77.9 | 75-100 |
| 1.18 | 158 | 15.80 | 37.90 | 62.1 | 55-90 |
| 600 Micron | 326 | 32.60 | 70.50 | 29.5 | 35-59 |
| 300 Micron | 175 | 17.50 | 88.00 | 12.0 | 8-30 |
| 150 Micron | 87 | 8.70 | 96.70 | 3.3 | 0-10 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 29.12.2018

## TEST REPORT ON COARSE AGGREGATES
## IS 383-1970 (RA- 2002)

**Client** : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
**Agency** : **Sri. M S Venkatesh,** Contractor, Bangalore.
**Name of Work** : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore.
**Name of Road** : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14.
Date of Testing : 29.12.2018
Material : 40mm Aggregates

Total Wt. of Aggregates in gms **15000**

| Is Sieve Size in mm | Weight Retained (gm) | Retained Weight in % | Cumulative Retained Weight in % | Cumulative Weight Passing in % | Spec.Limits |
|---|---|---|---|---|---|
| 80 | 0 | 0 | 0 | 100 | 100 |
| 40 | 176 | 1.17 | 1.17 | 98.83 | 95-100 |
| 20 | 8562 | 57.08 | 58.25 | 41.75 | 30-70 |
| 10 | 3328 | 22.19 | 80.44 | 19.56 | 10-35 |
| 4.75 | 2685 | 17.90 | 98.34 | 1.66 | 0-5 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 29.12.2018

## TEST REPORT ON COARSE AGGREGATES
## IS 383-1970 (RA- 2002)

**Client** : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
**Agency** : **Sri. M S Venkatesh,** Contractor, Bangalore.
**Name of Work** : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore.
**Name of Road** : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14.
Date of Testing : 29.12.2018
Material : 20mm Aggregates

Total Wt. of Aggregates in gms= **5000**

| Is Sieve Size in mm | Weight Retained (gm) | Retained Weight in % | Cumulative Retained Weight in % | Cumulative Weight Passing in % | Spec.Limits |
|---|---|---|---|---|---|
| 40 | 0 | 0 | 0 | 100 | 100 |
| 20 | 176 | 3.5 | 3.5 | 96.5 | 95-100 |
| 10 | 2965 | 59.3 | 62.8 | 37.2 | 25-55 |
| 4.75 | 1728 | 34.6 | 97.4 | 2.6 | 0-10 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 DATE : 29.12.2018

## TEST REPORT ON SOLID CONCRETE BLOCKS

**Client** : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

**Agency** : **Sri. M S Venkatesh,** Contractor, Bangalore.

**Name of the Work** : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore.

**Name of Road** : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14.

**Date of Testing** : 29.12.2018

**Size of Blocks** : 400mm x 200mm x 200mm

**Cross Sectional Area** : 40000 $mm^2$

**Technical Reference** : IS: 2185 (Part 1) - 2005

**No. of Blocks Tested** : 04

| Sl.No. | Block ID | Wt. in Kg | Failure load (KN) | Compressive strength ($N/mm^2$) | Requirement as per IS 2185 (Part 1) - 2005 |
|---|---|---|---|---|---|
| 1 | Block 1 | 25.6 | 285.6 | 3.57 | Minimum required Compressive Strength of Individual Units 3.50 $N/mm^2$ |
| 2 | Block 2 | 26.8 | 294.5 | 3.68 | |
| 3 | Block 3 | 28.1 | 275.9 | 3.45 | |
| 4 | Block 4 | 27.9 | 293.6 | 3.67 | |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 15.01.2019

## TEST REPORT ON CONCRETE CUBES

| | |
|---|---|
| Client | : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| Contractor | : **Sri. M S Venkatesh,** Contractor, Bangalore. |
| Name of the work | : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| Name of Road | : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| Sample ID | : Cement Concrete |
| Size of cubes | : 150mmx150mmx150mm |
| Cross Sectional Area | : 22500 $mm^2$ |
| Technical Reference | : IS: 516-1959 (Reaffirmed 2008) |
| Grade of Concrete | : $M_{15}$ |
| Compressive Strength as on | : 7th day |

| Sl.No. | Date of casting | Date of testing | Weight of cube (Kg) | Failure load (KN) | Compressive strength ($N/mm^2$) |
|---|---|---|---|---|---|
| 1 | 08.01.2019 | 15.01.2019 | 8.132 | 285.6 | 12.69 |
| 2 | 08.01.2019 | 15.01.2019 | 8.142 | 294.5 | 13.09 |
| 3 | 08.01.2019 | 15.01.2019 | 8.165 | 279.8 | 12.44 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 05.02.2019

## TEST REPORT ON CONCRETE CUBES

| | |
|---|---|
| Client | : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| Contractor | : **Sri. M S Venkatesh,** Contractor, Bangalore. |
| Name of the work | : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| Name of Road | : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| Sample ID | : Cement Concrete |
| Size of cubes | : 150mmx150mmx150mm |
| Cross Sectional Area | : 22500 $mm^2$ |
| Technical Reference | : IS: 516-1959 (Reaffirmed 2008) |
| Grade of Concrete | : $M_{15}$ |
| Compressive Strength as on | : 28th day |

| Sl.No. | Date of casting | Date of testing | Weight of cube (Kg) | Failure load (KN) | Compressive strength ($N/mm^2$) |
|---|---|---|---|---|---|
| 1 | 08.01.2019 | 05.02.2019 | 8.175 | 426.5 | 18.96 |
| 2 | 08.01.2019 | 05.02.2019 | 8.196 | 396.6 | 17.63 |
| 3 | 08.01.2019 | 05.02.2019 | 8.188 | 385.7 | 17.14 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 10.02.2019

## TEST REPORT ON CONCRETE CUBES

| | |
|---|---|
| Client | : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| Contractor | : **Sri. M S Venkatesh,** Contractor, Bangalore. |
| Name of the work | : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| Name of Road | : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| Sample ID | : Cement Concrete |
| Size of cubes | : 150mmx150mmx150mm |
| Cross Sectional Area | : 22500 $mm^2$ |
| Technical Reference | : IS: 516-1959 (Reaffirmed 2008) |
| Grade of Concrete | : $M_{20}$ |
| Compressive Strength as on | : 7th day |

| Sl.No. | Date of casting | Date of testing | Weight of cube (Kg) | Failure load (KN) | Compressive strength ($N/mm^2$) |
|---|---|---|---|---|---|
| 1 | 03.02.2019 | 10.02.2019 | 8.135 | 352.6 | 15.67 |
| 2 | 03.02.2019 | 10.02.2019 | 8.129 | 367.2 | 16.32 |
| 3 | 03.02.2019 | 10.02.2019 | 8.134 | 381.2 | 16.94 |

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Date: 10.02.2019

## TEST REPORT ON CONCRETE CUBES

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| Contractor | : **Sri. M S Venkatesh,** Contractor, Bangalore. |
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| Name of Road | : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| Sample ID | : Cement Concrete |
| Size of cubes | : 150mmx150mmx150mm |
| Cross Sectional Area | : 22500 $mm^2$ |
| Technical Reference | : IS: 516-1959 (Reaffirmed 2008) |
| Grade of Concrete | : $M_{20}$ |
| Compressive Strength as on | : 7th day |

| Sl.No. | Date of casting | Date of testing | Weight of cube (Kg) | Failure load (KN) | Compressive strength ($N/mm^2$) |
|---|---|---|---|---|---|
| 1 | 03.02.2019 | 10.02.2019 | 8.139 | 365.8 | 16.26 |
| 2 | 03.02.2019 | 10.02.2019 | 8.158 | 364.2 | 16.19 |
| 3 | 03.02.2019 | 10.02.2019 | 8.179 | 358.9 | 15.95 |

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|---|---|
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| Name of Road | : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| Sample ID | : Cement Concrete |
| Size of cubes | : 150mmx150mmx150mm |
| Cross Sectional Area | : 22500 $mm^2$ |
| Technical Reference | : IS: 516-1959 (Reaffirmed 2008) |
| Grade of Concrete | : $M_{20}$ |
| Compressive Strength as on | : 7th day |

| Sl.No. | Date of casting | Date of testing | Weight of cube (Kg) | Failure load (KN) | Compressive strength ($N/mm^2$) |
|---|---|---|---|---|---|
| 1 | 03.02.2019 | 10.02.2019 | 8.145 | 354.8 | 15.77 |
| 2 | 03.02.2019 | 10.02.2019 | 8.167 | 369.5 | 16.42 |
| 3 | 03.02.2019 | 10.02.2019 | 8.129 | 375.2 | 16.68 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 13.01.2019

## PRECAST SLAB 100mm Thick(CORE) TEST REPORT

**Client** : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

**Contractor** : **Sri. M S Venkatesh,** Contractor, Bangalore.

**Name of Work** : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04) , BBMP, Bangalore.

**Name of Road** : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14.

**No.of Sample Tested** : 03

**Date of Testing** : 13.01.2019

**Techinical Reference** : IS:516-1959 (Reaffirmed 1999), SP-24:1983.

**Grade of Concrete** : $M_{20}$

| Sl. No. | Dia of Core D (mm) | Height of Core H (mm) | Core Wt (Kg) | Density of Core (kg / $m^3$) | H / D | Correction factor (Based on H/D) | Failure Load (kN) | Core Strength ( $N/mm^2$) | Correction Factor for the Dia. (Strength of the Core x 1.08) | Corrected Cylinder Compressive Strength ($N/mm^2$) | Equivalent Cube Compressive Strength ($N/mm^2$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.00 | 83.00 | 0.378 | 2319.44 | 1.66 | 0.960 | 32.50 | 16.55 | 17.88 | 17.16 | 21.45 |
| 2 | 50.00 | 86.00 | 0.396 | 2345.13 | 1.72 | 0.960 | 33.60 | 17.11 | 18.48 | 17.74 | 22.18 |
| 3 | 50.00 | 90.00 | 0.421 | 2382.37 | 1.80 | 0.960 | 31.90 | 16.25 | 17.55 | 16.84 | 21.06 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 17.01.2019

## KERB STONE (CORE) TEST REPORT

| | | |
|---|---|---|
| **Client** | : | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | : | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of Work** | : | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| **Name of Road** | : | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **No.of Sample Tested** | : | 03 |
| **Date of Testing** | : | 17.01.2019 |
| **Techinical Reference** | : | IS:516-1959 (Reaffirmed 1999), SP-24:1983. |
| **Grade of Concrete** | : | $M_{15}$ |

| Sl. No. | Dia of Core D (mm) | Height of Core H (mm) | Core Wt (Kg) | Density of Core (kg / $m^3$) | H / D | Correction factor (Based on H/D) | Failure Load (kN) | Core Strength ( $N/mm^2$) | Correction Factor for the Dia. (Strength of the Core x 1.08) | Corrected Cylinder Compressive Strength ($N/mm^2$) | Equivalent Cube Compressive Strength ($N/mm^2$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.00 | 73.00 | 0.332 | 2316.25 | 1.46 | 0.960 | 26.80 | 13.65 | 14.74 | 14.15 | 17.69 |
| 2 | 50.00 | 75.00 | 0.346 | 2349.55 | 1.50 | 0.960 | 26.80 | 13.65 | 14.74 | 14.15 | 17.69 |
| 3 | 50.00 | 79.00 | 0.368 | 2372.42 | 1.58 | 0.960 | 28.60 | 14.57 | 15.73 | 15.10 | 18.88 |

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JobNo: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 27.01.2019

## GRADATION FOR GSB (Close Graded)
## IS : 2720 (Part - 4)

**Agency** : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.
**Client** : **Sri. M S Venkatesh,** Contractor, Bangalore.
**Name of work** : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP,
**Name of Road** : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14.

**Date of Testing** : 27.01.2019

**Oven Dry Wt (gm) :** 13737

TABLE – 1

| Is Sieve Size in mm | Weight Retained (gm) | Cumulative Weight Retained (gm) | Cumulative % of Retained | Cumulative % of Passing | Specified Limits |
|---|---|---|---|---|---|
| 53 | - | - | - | 100 | 100 |
| 26.5 | 1723 | 1723 | 12.54 | 87.46 | 70-100 |
| 9.5 | 2256 | 3979 | 28.97 | 71.03 | 50-80 |
| 4.75 | 2358 | 6337 | 46.13 | 53.87 | 40-65 |
| 2.36 | 1864 | 8201 | 59.70 | 40.30 | 30-50 |
| 0.425 | 2452 | 10653 | 77.55 | 22.45 | 15-25 |
| 0.075 | 2358 | 13011 | 94.72 | 5.28 | 3-10 |
| PAN | 726 | | | | |
| Total | 13737 | | | | |

TABLE – 2: Tests on filler screen materials (As per Table : 400-13)

| Sl. No. | Particulars | Test Results | Standards as per Specifications |
|---|---|---|---|
| 1 | Liquid Limit, % | 22.00 | 25.0% Maximum. |
| 2 | Plasticity Index, % | Non Plastic | 6.0% Maximum. |

**Remarks:** Satisfies MORTH Specifications as per Table 400-2, Grading II

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 29.01.2019

## GRADATION FOR WMM
## MORTH TABLE-400-11

**Client** : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

**Agency** : **Sri. M S Venkatesh,** Contractor, Bangalore.

**Name of Work** : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore.

**Name of Road** : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14.

**Date of Testing** : 29.01.2019

**Material Type** : Wet Mix Macadam

Oven Dry.Wt 10500

| Is Sieve Size in mm | Weight Retained (gm) | Cumulative Weight Retained (gm) | Cumulative % of Retained | Cumulative % of Passing | Spec.Limits |
|---|---|---|---|---|---|
| 53 | 0 | 0 | 0 | 100 | 100 |
| 45 | 315 | 315 | 3.0 | 97.0 | 95-100 |
| 22.4 | 3265 | 3580 | 34.1 | 65.9 | 60-80 |
| 11.2 | 1685 | 5265 | 50.1 | 49.9 | 40-60 |
| 4.75 | 2358 | 7623 | 72.6 | 27.4 | 25-40 |
| 2.36 | 1148 | 8771 | 83.5 | 16.5 | 15-30 |
| 0.600 | 759 | 9530 | 90.8 | 9.2 | 8-22 |
| 0.075 | 859 | 10389 | 98.9 | 1.1 | 0-8 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 **Date:** 29.01.2019

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| **Client** | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of the Work** | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. [illegible] |
| **Name of Road** | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **Type of Mix** | Wet Mix macadam |
| **Date of Testing** | 29.01.2019 |

| Sl No. | Details | Trial No. 1 | 2 | 3 | Average |
|---|---|---|---|---|---|
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 382 | 387 | 392 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 83 | 85 | 89 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 299 | 302 | 303 | |
| 4 | Aggregate Impact value = percent fines 100* ($W_2/W_1$)% | 21.73 | 21.96 | 22.70 | 22.13 |

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

**Note:**

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29.01.2019

Job No.: CQCE/BBMP/MSV/W.No.14/2018-19

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| **Client** | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of Work** | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. |
| **Name of Road** | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **Technical Reference** | IS 2386(Part 1) 1963 (RA 2011) |
| **Type of Mix** | Wet Mix Macadam |
| **Sample ID** | WMM Layer |
| **Date of Testing** | 29.01.2019 |

Result : Flakiness Index = **11.58%**

Elongation Index = **14.26%**

**Result : Combined Flakiness & Elongation index** **25.84%**

**Comments:**

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

**Note:**

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date : 29.01.2019

## ATTERBERG LIMITS TEST FOR WMM
## MORTH TABLE-400-11

**Client** : **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore.

**Agency** : **Sri. M S Venkatesh,** Contractor, Bangalore.

**Name of Work** : Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore.

**Name of Road** : Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14.

**Date of Testing** : 29.01.2019

**Material Type** : Wet Mix Macadam

**As per MORTH Table 400-13**

| Sl. No. | Particulars | Test Results | Standards as per Specifications |
|---|---|---|---|
| 1 | Liquid Limit | 22.00 | - |
| 2 | Plasticity Index, % | Non Plastic | 6.0% Maximum. |

**Note:**

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 13.02.2019

## Specific Gravity And Water Absorption Test

IS: 2386 Part III

| | |
|---|---|
| **Client** | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of the Work** | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| **Name of Road** | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **Source / Location** | Hotmix Plant, Bangalore. |
| **Type of Mix** | Bituminous Macadam |
| **Date of Testing** | 13.02.2019 |

| Sl. No. | Details | Notation | Test Number | | | Mean Value |
|---|---|---|---|---|---|---|
| | | | Test 1 | Test 2 | Test 3 | |
| 1 | Weight of aggregate suspended in water with the basket | $W_1$ g | 2018 | 2020 | 2023 | |
| 2 | Weight of basket suspended in water | $W_2$ g | 754 | 754 | 754 | |
| 3 | Weight of saturated aggregate in water | $(W_1 - W_2) = W_s$ g | 1264 | 1266 | 1269 | |
| 4 | Weight of saturated surface dry aggregate in air | $W_3$ g | 2014 | 2016 | 2019 | |
| 5 | Weight of water equal to the volume of the aggregate | $(W_3 - W_S)$ g | 755 | 755 | 755 | |
| 6 | Weight of oven dried aggregate | $W_4$ g | 2004 | 2008 | 2009 | |
| 7 | Specific Gravity | $W_4/(W_3-W_S)$ | 2.672 | 2.677 | 2.679 | 2.675 |
| 8 | Apparent Specific gravity | $W_4/(W_4-W_S)$ | 2.708 | 2.706 | 2.715 | 2.711 |
| 9 | Water Absorption | $((W_3-W_4)*100)/W_4$ | 0.50% | 0.40% | 0.50% | 0.50% |

**Comments:**

→ Maximum allowable Aggregate Water absorption value for Bituminous Macadam is 2.0%

**Note:**

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 14.02.2019

## Aggregate Gradation Test
IS : 2386 Part I

| | |
|---|---|
| **Client** | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of the work** | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| **Name of Road** | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **Sample ID** | Hotmix Plant, Bangalore. |
| **Type of Mix** | Bituminous Macadam |
| **Date of Testing** | 14.02.2019 |

**5000** gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | Grade-II As per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 26.5 | 0 | 0 | 0 | 100 | 100 | Gradation satisfies Grade-II MORTH specification |
| 19 | 262 | 5.24 | 5.24 | 94.76 | 90-100 | |
| 13.2 | 1854 | 37.08 | 42.32 | 57.68 | 56-88 | |
| 4.75 | 1652 | 33.04 | 75.36 | 24.64 | 16-36 | |
| 2.36 | 765 | 15.30 | 90.66 | 9.34 | 4-19 | |
| 0.3 | 269 | 5.38 | 96.04 | 3.96 | 2-10 | |
| 0.075 | 82 | 1.64 | 97.68 | 2.32 | 0-8 | |

Total Weight of Sample: **5000** gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | Grade-II As per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 26.5 | 0 | 0 | 0 | 100 | 100 | Gradation satisfies Grade-II MORTH specification |
| 19 | 395 | 7.90 | 7.90 | 92.10 | 90-100 | |
| 13.2 | 1426 | 28.52 | 36.42 | 63.58 | 56-88 | |
| 4.75 | 1695 | 33.90 | 70.32 | 29.68 | 16-36 | |
| 2.36 | 635 | 12.70 | 83.02 | 16.98 | 4-19 | |
| 0.3 | 468 | 9.36 | 92.38 | 7.62 | 2-10 | |
| 0.075 | 72 | 1.44 | 93.82 | 6.18 | 0-8 | |

**Note:**

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ISO 9001:2000 CERTIFIED


Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 14.02.2019

## BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS MACADAM MIX

### AASHTO T 164 & AASHTO T 30

| | |
|---|---|
| CLIENT | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| AGENCY | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| NAME OF THE WORK | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| Name of Road | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| SAMPLE I/D | Sample Supplied by Agency |
| DATE OF TESTING | 14.02.2019 |

**BITUMEN CONTENT DETERMINATION**

| Description | Trail 1 | Trail 2 |
|---|---|---|
| 1. Weight of Mixture before Test, g | 500 | 500 |
| 2. Weight of Mixture after Test, g | 482.5 | 482 |
| 3. Weight of Asphalt and Mineral matter Extracted, g | - | - |
| 4. Weight of Mineral Matter, g. | - | - |
| 5. Weight of Ash, g | | |
| 6. Weight of Bitumen Extracted, g. (corrected) | 17.5 | 18.00 |
| 7. Bitumen content in % | 3.50 | 3.60 |
| 8. Average | 3.55 | |

**GRADATION AFTER EXTRACTION**

| SIEVE SIZE | Trail 1 | | | | JOBMIX |
|---|---|---|---|---|---|
| mm | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | Gradation |
| 26.5 | 0 | 0 | 0 | 100 | 100 |
| 19 | 42.6 | 8.83 | 8.83 | 91.17 | 90-100 |
| 13.2 | 158 | 32.75 | 41.58 | 58.42 | 56-88 |
| 4.75 | 165.5 | 34.30 | 75.88 | 24.12 | 16-36 |
| 2.36 | 58.6 | 12.15 | 88.02 | 11.98 | 4-19 |
| 0.3 | 22.8 | 4.73 | 92.75 | 7.25 | 2-10 |
| 0.075 | 11.6 | 2.40 | 95.15 | 4.85 | 0-8 |

| SIEVE SIZE | Trail 2 | | | | JOBMIX |
|---|---|---|---|---|---|
| mm | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | Gradation |
| 26.5 | 0 | 0 | 0 | 100 | 100 |
| 19 | 43.5 | 8.70 | 8.70 | 91.30 | 90-100 |
| 13.2 | 165.2 | 33.04 | 41.74 | 58.26 | 56-88 |
| 4.75 | 158.6 | 31.72 | 73.46 | 26.54 | 16-36 |
| 2.36 | 75.6 | 15.12 | 88.58 | 11.42 | 4-19 |
| 0.3 | 35.2 | 7.04 | 95.62 | 4.38 | 2-10 |
| 0.075 | 8.7 | 1.74 | 97.36 | 2.64 | 0-8 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19

Date: 16.02.2019

## TEST REPORT

| | | |
|---|---|---|
| **Client** | : | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | : | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of the work** | : | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| **Name of Road** | : | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **Source of location** | : | Hot mix Plant, Bangalore |
| **Date of testing** | : | 16.02.2019 |

The results of the tests conducted on the bitumen sample using for Bituminous Concrete

| Sl. No | Description | Test Result | Requirement as per IS:73:2013 |
|---|---|---|---|
| 1 | Penetration at 25 $^0$C, 1/10 mm | 66 | 60 to 70 |
| 2 | Softening point, $^0$C | 46 | Min. 45 |
| 3 | Ductility at 27$^0$C, cm | 100 > | Min. 50 |
| 4 | Flash Point, $^0$C | 292 | Min. 220 |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 16.02.2019

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| **Client** | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of the Work** | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| **Name of Road** | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **Source / Location** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 16.02.2019 |

| Sl No. | Details | Trial No. | | Average |
|---|---|---|---|---|
| | | 1 | 2 | |
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 383 | 386 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 82 | 86 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 301 | 300 | |
| 4 | Aggregate Impact value = percent fines<br>100* ($W_2/W_1$) percent | 21.41 | 22.28 | **21.84** |

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 16.02.2019

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Client | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| Agency | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| Name of Work | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| Name of Road | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| Technical Reference | IS 2386(Part 1) 1963 (RA 2007) |
| Type of Mix | Bituminous Concrete |
| Date of Testing | 16.02.2019 |

Result : Flakiness Index = **11.58%**

Elongation Index = **13.54%**

Result : Combined Flakiness & Elongation index **25.12%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

Note:

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 16.02.2019

## Specific Gravity And Water Absorption Test
IS: 2386 Part III

| | |
|---|---|
| **Client** | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of the Work** | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| **Name of Road** | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 16.02.2019 |

| Sl. No. | Details | Notation | Test Number | | | Mean Value |
|---|---|---|---|---|---|---|
| | | | Test 1 | Test 2 | Test 3 | |
| 1 | Weight of aggregate suspended in water with the basket | $W_1$ g | 2015 | 2018 | 2020 | |
| 2 | Weight of basket suspended in water | $W_2$ g | 755 | 755 | 755 | |
| 3 | Weight of saturated aggregate in water | $(W_1 - W_2) = W_s$ g | 1260 | 1263 | 1265 | |
| 4 | Weight of saturated surface dry aggregate in air | $W_3$ g | 2011 | 2013 | 2015 | |
| 5 | Weight of water equal to the volume of the aggregate | $(W_3 - W_S)$ g | 751 | 750 | 750 | |
| 6 | Weight of oven dried aggregate | $W_4$ g | 2005 | 2008 | 2010 | |
| 7 | Specific Gravity | $W_4/(W_3-W_S)$ | 2.670 | 2.677 | 2.680 | 2.676 |
| 8 | Apparent Specific gravity | $W_4/(W_4-W_S)$ | 2.691 | 2.695 | 2.698 | 2.695 |
| 9 | Water Absorption | $((W_3-W_4)*100)/W_4$ | 0.30% | 0.25% | 0.25% | 0.27% |

Comments:
→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 17.02.2019

## Aggregate Gradation Test

IS : 2386 Part I

| | |
|---|---|
| **Client** | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of theWork** | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| **Name of Road** | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **Sample I / D** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 17.02.2019 |

Total Weight of Sample: **5000** gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | JOBMIX Gradation as per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 19 | 0 | 0 | 0 | 100 | 100 | Gradation satisfies Bituminous concrete Grade-II specification as per MORTH |
| 13.2 | 532.6 | 10.65 | 10.65 | 89.35 | 79 - 100 | |
| 9.5 | 485.6 | 9.71 | 20.36 | 79.64 | 70 - 88 | |
| 4.75 | 765.2 | 15.30 | 35.67 | 64.33 | 53 - 71 | |
| 2.36 | 532.5 | 10.65 | 46.32 | 53.68 | 42 - 58 | |
| 1.18 | 435.8 | 8.72 | 55.03 | 44.97 | 34 - 48 | |
| 0.600 | 625.3 | 12.51 | 67.54 | 32.46 | 26 - 38 | |
| 0.300 | 532.6 | 10.65 | 78.19 | 21.81 | 18 - 28 | |
| 0.150 | 338.5 | 6.77 | 84.96 | 15.04 | 12 - 20 | |
| 0.075 | 416.8 | 8.34 | 93.30 | 6.70 | 4 - 10 | |

Total Weight of Sample: **5000** gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | JOBMIX Gradation as per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 19 | 0 | 0 | 0 | 100 | 100 | Gradation satisfies Bituminous concrete Grade-II specification as per MORTH |
| 13.2 | 596 | 11.92 | 11.92 | 88.08 | 79 - 100 | |
| 9.5 | 496 | 9.92 | 21.84 | 78.16 | 70 - 88 | |
| 4.75 | 725.5 | 14.51 | 36.35 | 63.65 | 53 - 71 | |
| 2.36 | 568 | 11.36 | 47.71 | 52.29 | 42 - 58 | |
| 1.18 | 528.2 | 10.56 | 58.27 | 41.73 | 34 - 48 | |
| 0.600 | 635.8 | 12.72 | 70.99 | 29.01 | 26 - 38 | |
| 0.300 | 495.2 | 9.90 | 80.89 | 19.11 | 18 - 28 | |
| 0.150 | 258.6 | 5.17 | 86.07 | 13.93 | 12 - 20 | |
| 0.075 | 338.5 | 6.77 | 92.84 | 7.16 | 4 - 10 | |

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Job No.: CQCE/BBMP/MSV/W.No.14/2018-19 Date: 17.02.2019

## TEST REPORT ON STABILITY OF MIX

| | | |
|---|---|---|
| **Client** | : | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| **Agency** | : | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| **Name of the Work** | : | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| **Name of Road** | : | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| **Source of location** | : | Hot mix Plant, Bangalore |
| **Type of Mix** | : | Bituminous Concrete |
| **Date of Testing** | : | 17.02.2019 |

The results of the tests conducted on the bituminous concrete mix sample are as follows:

| Sl. No | Description | Test Result 1 | Test Result 2 | Requirement as per MORTH (Table 500-19) |
|---|---|---|---|---|
| 1 | Marshal Stability, Kn | 9.69 | 10.56 | 9 Kn (min) |
| 2 | Marshal flow, mm | 3.28 | 2.54 | 2 – 4 |
| 3 | Percent air voids in Mineral Aggregate | 13.29 | 14.23 | 13 – 15 |
| 4 | Voids in Compacted Mix | 4.15 | 5.28 | 3 – 6 |
| 5 | Percent Voids filled with Bitumen | 70.52 | 72.36 | 65 - 75 |
| 6 | Density, g/cc | 2.25 | 2.11 | -- |

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## BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

| | |
|---|---|
| CLIENT | **Executive Engineer,** Dasarahalli Division, BBMP, Bangalore. |
| AGENCY | **Sri. M S Venkatesh,** Contractor, Bangalore. |
| NAME OF THE WORK | Improvements & asphalting to main and cross roads at Soap Factory Layout, M.S.Ramaiah Layout, Siddeshwara Layout, Bhuvaneshwari Layout & Vishweshwaraiah Layout in Bagalagunte in Ward No:14 ( 5-Works) Package No. DZ 2017-18-(04), BBMP, Bangalore. |
| Name of Road | Improvements to Drains at Vishweshwaraiah layout in Bagalagunte in ward no.14. |
| DATE OF TESTING | 17.02.2019 |

### BITUMEN CONTENT DETERMINATION

| Description | Sample 1 | Sample 2 |
|---|---|---|
| 1. Weight of Mixture before Test, g | 500 | 500 |
| 2. Weight of Mixture after Test, g | 470.5 | 470 |
| 3. Weight of Asphalt and Mineral matter Extracted, g | 29.5 | 30 |
| 4. Weight of Mineral Matter, g. | - | - |
| 5. Weight of Ash, g | - | - |
| 6. Weight of Bitumen Extracted, g. (corrected) | 29.5 | 30 |
| 7. Bitumen content in % | 5.90 | 6.00 |
| 8. Average | 5.95 | |

### GRADATION AFTER EXTRACTION

TABLE - 1

| SIEVE SIZE | Percent Passing, % | | JOBMIX |
|---|---|---|---|
| mm | Sample 1 | Sample 2 | Gradation |
| 19 | 100.0 | 100.0 | 100 |
| 13.2 | 95.6 | 96.2 | 79-100 |
| 9.5 | 75.9 | 88.3 | 70-88 |
| 4.75 | 65.3 | 64.2 | 53-71 |
| 2.36 | 48.2 | 52.8 | 42-58 |
| 1.18 | 44.8 | 40.6 | 34-48 |
| 0.6 | 35.6 | 35.8 | 26-38 |
| 0.3 | 31.6 | 30.8 | 18-28 |
| 0.15 | 11.9 | 19.2 | 12-20 |
| 0.075 | 8.2 | 6.8 | 4-10 |

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